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**SERIES**

**4**

**School Bus Driver  
Improvement Program**

**Defensive  
Driving**



## TABLE OF CONTENTS

<b>SERIES 4 - DEFENSIVE DRIVING</b> . . . . .	<b>1</b>
OBJECTIVE . . . . .	1
INTRODUCTION . . . . .	2
<b>SERIES 4.1 - THE PROBLEM, THE BACKGROUND AND THE LAW</b> . . . . .	<b>4</b>
THE COLLISION PROBLEM . . . . .	4
THE PERFECT DRIVER . . . . .	5
KNOWING THE RULES . . . . .	7
THE SIX VARIABLES . . . . .	9
DRIVERS' MENTAL INVENTORY CHECKLIST . . . . .	12
<b>SERIES 4.2 - DEFENSIVE DRIVING CONCEPTS AND PRACTICES</b> . . . . .	<b>14</b>
INTRODUCTION . . . . .	14
THE ELEMENTS OF DEFENSIVE DRIVING . . . . .	15
Zone of Awareness . . . . .	18
Searching for Clues . . . . .	19
Visual Habits . . . . .	22
DETECTING AND INTERPRETING CLUES . . . . .	24
Parked Vehicles . . . . .	24
Roadway Hazard Clues . . . . .	26
Sight Distance Limitations . . . . .	26
Manoeuvring Limitations . . . . .	27
Traction Limitations . . . . .	27
Traffic Conflict Points . . . . .	28
Detecting Other Driving Hazards . . . . .	29
Single Vehicle Hazards . . . . .	30
Multiple Vehicle Hazards . . . . .	31
Other Road User Hazards . . . . .	32
COLLISION AVOIDANCE . . . . .	33
Commentary Driving . . . . .	33
COLLISIONS WITH THE VEHICLE AHEAD . . . . .	38
Avoiding the Head-On Collision . . . . .	39
THE INTERSECTION COLLISION . . . . .	45
BEING PASSED BY ANOTHER VEHICLE . . . . .	48
THE ART OF PASSING . . . . .	50
THE MYSTERY CRASH . . . . .	54
OTHER TYPES OF COLLISION . . . . .	58
<b>SERIES 4.3 - EMERGENCY DRIVING TECHNIQUES</b> . . . . .	<b>59</b>
OBJECTIVE . . . . .	59
INTRODUCTION . . . . .	60
SKID CONTROL . . . . .	62
TIRE BLOWOUT . . . . .	66
LOSS OF BRAKES . . . . .	67
LOSS OF VISIBILITY . . . . .	68
If the Hood Flies Up . . . . .	69
If Headlights Fail . . . . .	69
If Mud/Slush is Splashed on Windshield . . . . .	69
If Windshield Wipers Fail During Rain/Snow/Sleet . . . . .	70
EVADING AN OBSTRUCTION . . . . .	71

<b>Appendix A. RAILWAY CROSSING SAFETY</b> . . . . .	<b>74</b>
Collision Statistics . . . . .	74
Railway Facts . . . . .	75
<b>Appendix B. SCHOOL BUS DRIVERS</b> . . . . .	<b>79</b>
Drive Safe and Smooth and Save . . . . .	79

OBJECTIVE

To be able to apply the knowledge and techniques contained in this module so as to avoid any preventable collision which is defined by the Canadian Safety Council as follows:

"A preventable collision is one in which you fail to do everything you reasonably could have done to prevent it."

## INTRODUCTION

The Canadian Safety Council tells us that:

"Defensive driving is driving to prevent collisions in spite of the incorrect actions of others and adverse conditions."

While a properly maintained vehicle is a very valuable tool in the prevention of collisions, the most influential factor is you, the driver. It is the driver's knowledge, skills, habits, attitudes and physical/mental condition that determines most collision involvement and, similarly, most collision avoidance.

This module will address these "driver factors" with particular emphasis on driver:

- Knowledge;
  
- Habit; and
  
- Attitude.

At the completion of this module, you will have gained the insight and knowledge required for you to drive "S.A.F.E.":

- S. SEE what is, and is going on, around you . . . to the front, the rear, the left and right. Don't forget about overhead traffic signals or overhanging objects and the road surface beneath your vehicle.
  
- A. ANALYZE what you have seen. For example, don't just "see" children playing beside the road, analyze this information and recognize the potential hazard that exists should a child dart into your path. Remember, you are not an observer - you are an active participant.
  
- F. FIND the way to avoid any hazard should the situation actually happen. To do this requires you to know what is happening around you as you do not want a plan which creates a second danger as you escape from the original hazard.
  
- E. ESCAPE by putting your plan into action should the dangerous situation develop.

THE COLLISION PROBLEM

Traffic collisions in Canada are a serious problem. And, whether you've ever been involved in a collision, it is very much your problem. The facts are staggering. Consider that:

- Each year Canadians are involved in 1,697,000 motor vehicle collisions! (That is 4,650 collisions each day or 194 collisions each and every hour.)
- Approximately every 2 hours somebody dies in a traffic collision. That's almost 12 people killed every day!
- Each year approximately 4,200 people are killed in traffic collisions.
- In the province of Alberta during a one year period, the insurance industry paid out in claims and adjustment costs \$561,569,000, under the provisions of private passenger car policies alone - more than one and one half million dollars per day!
- One out of every 3 people living today will be involved in a crippling or fatal traffic crash during their lifetime.



These figures are appalling, but there is some hope. Many organizations and individuals are attacking the problem in a variety of ways. By improving your knowledge and skills you can be part of the solution and, hopefully, avoid contributing to these statistics.

Studies have shown that the average driver is capable of driving at least twice as safely as he does currently. No one driving today can afford to drive at one half of their potential.

## THE PERFECT DRIVER

The focus of this program is driver improvement and it could be said that we are striving to have all drivers become "perfect drivers". You may be safe in thinking that perfect driving is not possible, but let's stop to consider what we mean by perfect driving. To do this, we'll take a leaf from the book of professional truck drivers, which is applicable to all drivers.

The good driver knows that perfect driving is achieved by having one perfect trip at a time. And a perfect trip is any trip characterized by the lack of one major trait: ERRORS. Error avoidance is the key to so-called perfect driving. Let us consider the types of errors that can occur to spoil that perfect trip. They include:

### 1. Collisions

This can be the most serious and costly error a driver can make, in both human and dollar terms.

## 2. Traffic Violations

To have a perfect trip you must obey the law. In addition to the basic laws of the road, which apply to all drivers, professional drivers must obey all additional laws which govern the operation of their units.

## 3. Vehicle Abuse

Vehicle abuse can lead to the wearing of the vehicle to the point it is unsafe to operate. An inexperienced, untrained, or careless driver can shorten the life of a vehicle drastically by not performing inspections, riding the clutch, braking excessively, driving in the wrong gear, etc. With the cost of new vehicles ever increasing, it is only good sense to drive in such a manner as to prolong the life of the vehicle.

## 4. Schedule Delays

Failure to adhere to your schedule can cause a variety of inconvenience and problems for others. This is true whether you are driving a bus, operating a car pool, or just meeting friends for an evening out. Being punctual involves planning to be punctual. You cannot make up for lack of planning by trying to make up time after the fact!

## 5. Discourtesy

No perfect trip can contain a discourteous act. Most acts of discourtesy create at least some degree of risk and, even if no risk is created directly, discourtesy leads to other motorists becoming hot-headed. This, in turn, creates a potential for hazard.

The successful avoidance of all these errors during your daily run means you have made a perfect trip. It's not such a difficult thing to do because all these errors are interrelated. By carefully and consciously driving to avoid collisions, you almost automatically avoid making the other types of driving errors.

Ninety-eight percent of the time driving is a relatively routine matter, but avoiding collisions during that other 2% can be extremely difficult. As a defensive driver, 100% avoidance of collisions should be your conscious objective.

### KNOWING THE RULES

The first step in becoming a safe, defensive driver is to thoroughly know, and understand, the traffic laws and general rules of safe driving as they relate to your type of driving. If you drive professionally, you must also understand the rules established by your employer under company policy.

While you may find the examination given for this module includes questions relating to your knowledge of the law and basic rules of safe driving, it is not our intent to "rehash" these laws and rules within this text.

As a licensed driver you are expected to know and understand the laws and rules about driving. We do, however, recognize that the rules change from time to time and that many drivers may not be aware of all these changes. Indeed, many of us could use a "refresher" even if the rules have not changed.

Your assignment is to review the materials found in the appropriate driver handbook(s) published by the Motor Vehicles Division. If your instructor does not have a supply on hand for your review, you may obtain copies from any Motor Vehicles Division licence issuing office.

Available handbooks are:

- Driver Basic Licence Information;
- Driver Licence Information for Driving as a Profession; and
- Motorcycles, Mopeds and Power Bikes Driver Licence Information.

## THE SIX VARIABLES

There are six variables in any driving situation and failure to properly adjust to all or any of these conditions may lead to a collision. They are:

1. Light conditions;
2. Weather conditions;
3. Road conditions;
4. Traffic conditions;
5. Condition of your vehicle; and
6. Condition of you, the driver.

Let's briefly consider each individually:

1. **Light** Both too little and too much light can create hazards. The sun can create a tremendous glare on your windshield, particularly if it is dusty. Bright headlights on other vehicles can create this same situation at night. Conversely, at dusk, the light in the atmosphere can make it very difficult to see other vehicles or to be seen by others.

- 2. Weather** As you are aware, weather also affects your ability to see and be seen. It can make roads (particularly grid roads) extremely slippery and cause you to lose control.
- 3. Road** Roads can present many hazards to the driver, particularly if they are foreign to him. Both geography and road construction can interact to make driving treacherous. Some hazardous conditions associated with roads include:
- curves;
  - soft shoulders/drop-offs;
  - potholes;
  - poor highway markings;
  - slippery surfaces; and
  - blind spots.
- 4. Traffic** Traffic can be heavy or light, fast or slow. Traffic conditions will vary according to the time of day, day of the week, season, etc. You must learn to adjust your pace to the flow of the traffic.
- 5. Vehicle** Does your vehicle respond instantly and effectively to your controlling efforts? If you are routinely performing your daily inspections, do not allow any perceived mechanical problem to fester, no matter how insignificant it seems at the time. The stakes are too high.

6. Driver Last, but hardly least! As a driver you have a grave responsibility to ensure that you are both mentally and physically capable of driving. There are many conditions which could interfere with this:

- fatigue;
- emotions (anger, fear, worry, etc.);
- alcohol or drug impairment;
- physical impairments (defective hearing or eyesight, illness, etc.); and
- habits.

Each of these conditions is critical on its own. The problem arises because you seldom encounter a situation with one of these conditions on its own. They tend to be grouped together and their effects on your driving can be compounded. The important point is that you learn to recognize when any or all of these conditions is adversely affecting your driving and adjust your driving behaviour accordingly. This may mean not driving until after the situation has improved.

What can you do to make sure that these conditions don't gang up on you? At a very minimum, you should attempt to anticipate the conditions you are likely to encounter during your drive. Try using the PRE-TRIP MENTAL INVENTORY, which works like this: Before you start, get behind the steering wheel and sit there for a minute or two. While you think about the driving conditions you are likely to encounter, ask yourself:

"Are there any unusual conditions of light, weather, road or traffic that I can expect? Am I fit to drive? Am I rested or tired; calm or emotionally disturbed? If I'm taking medications, how will they affect my driving?"

After you've answered these questions, fasten your safety belt, turn on the ignition, and go. You've mentally prepared yourself for the driving conditions you could meet on the trip ahead.

To be fully prepared, however, requires a more thorough "examination" of you, your vehicle, and the driving environment. The following checklist itemizes the points you should consider in going through a detailed mental inventory:

### DRIVERS' MENTAL INVENTORY CHECKLIST

#### 1. Driver Condition

- **Physical**

- Am I fully rested?
- Free from alcohol or drug impairment?
- Not suffering from effects of medication?
- Not ill?

- **Mental**

- Am I relaxed and free from tension?
- Able to concentrate fully on driving?
- Do I have a courteous, careful and considerate attitude?



## 2. Vehicle Condition

- **Under the Hood**
  - Fluids/Lubricants at proper level?
  - Connections sound?
  - Battery terminals/general appearance?
  - Belts and hoses OK?
- **Exterior**
  - Lights and signals all working?
  - Exhaust system?
  - Tires and wheels?
  - Doors working?
  - Windshield and wipers?
  - General appearance?
- **Interior**
  - Signals/indicators/gauges all working?
  - Mirrors properly adjusted?
  - Heater and defroster working?
  - Horn?
  - Emergency equipment?

## 3. Condition of the Environment

- Light
- Weather
- Road
- Traffic

(What adjustments, if any, are required to compensate for these conditions?)

INTRODUCTION

How does one become a defensive driver? It really involves no magic, but it does require a conscious effort until you have trained yourself to respond in an automatic manner to follow and practice the basic collision prevention formula, which is to:

1. Recognize the hazard;
2. Understand the defense; and then
3. Act in time.

Virtually every driving situation has potential hazards and in order to protect yourself it is not enough to know what you're doing. You must be aware of what is developing around you. The actions of others, the condition of the roadway, parked cars, visibility, etc., are all a part of that development. Far too often we are lulled into a state of relaxed, well being when we drive and our attention wanders. In this state we can easily miss detection of a hazard. When this happens an easily avoided problem can rapidly become a full blown emergency.

It is important that you remain alert and consciously search for hazards as you drive. If you consciously practice hazard detection, you will soon develop the habit and become an "automatic hazard detector".

Both your survival and that of your passengers depends on your ability to identify the clues that indicate a potential or actual danger.

## THE ELEMENTS OF DEFENSIVE DRIVING

Before getting into the specifics, let's briefly consider the elements of defensive driving.

In order to successfully avoid collisions, the defensive driver requires a high degree of knowledge, alertness, and foresight in recognizing collision producing situations when they occur, and he must exercise judgement and skill in executing his "defense". Individually, these are:

- 1. Knowledge** This comes from many sources, including your Alberta "Operators' Manuals" and other printed materials. It must also include recognition of driving hazards and the proper methods to protect yourself against them. A good deal of knowledge about driving can be acquired through experience, but experience, contrary to reputation, is a spotty and hazardous teacher when it comes to driving. Traffic safety experts are convinced that knowledge of driving should be acquired through a planned program, such as the one you are taking now.
- 2. Alertness** Alertness in driving is the habit of keeping one's attention focused on the driving job and free of distractions. It involves an attitude of watchfulness for collision-causing factors and the ability to recognize them instantly. Being fully alert requires use of more than just your eyes. Your hearing, sense of touch and smell all receive messages that you, the

driver, must interpret. The habit of alertness can be developed consciously and is improved with practice.

- 3. Foresight** This is the ability to anticipate and prepare for most eventualities. It consists of being able to size up traffic situations as far ahead as possible, to anticipate how they are likely to develop, and to decide whether these developments will endanger one's vehicle.
- 4. Judgement** Good judgement implies a recognition of the alternatives present in any traffic situation and the ability to arrive at a wise choice in time to avoid a collision. It depends upon knowledge and experience and, also, upon such intangibles as intuition and common sense.
- 5. Skill** Skill is the ability to manipulate the controls of your vehicle to successfully perform basic traffic manoeuvres such as making turns, passing, reversing and parking. There is a right way to do each of these. Skill is developed through learning how to do them the right way, and then **DOING THEM THE RIGHT WAY EVERY TIME.**
- 6. Good Habits** Another way to say good habits is to talk about "unconscious competence". What this really means is that you have consciously practiced correct procedure to the point you no longer have to think about it to do it right. Correct performance has become instinctive. Good visual habits, for

example, are one of the most important tools available to the defensive driver.

There is a useful acronym which can help you put the elements of defensive driving together and be a defensive driver. The acronym is SIPDE and the individual letters have special significance for helping you put the collision prevention formula into action. Here's what **SIPDE** stands for:

**Search** - your driving environment constantly for hazardous clues.

**Investigate** - clues which could become hazards.

**Predict** - what you expect to develop based on your instantaneous investigation of the hazard clues.

**Decide** - on a course of action to minimize or eliminate the hazard.

**Execute** - your action plan.

Most people go through the mental process of searching, investigating, predicting, deciding and executing unconsciously while they're driving anyway, without knowing about SIPDE. The problem arises, however, because there is a tendency for our minds to wander and the process stops. But, by knowing the acronym, it helps focus your mind, and if you flash it through your mind relatively frequently, you will have developed an important trick for maintaining mental alertness.

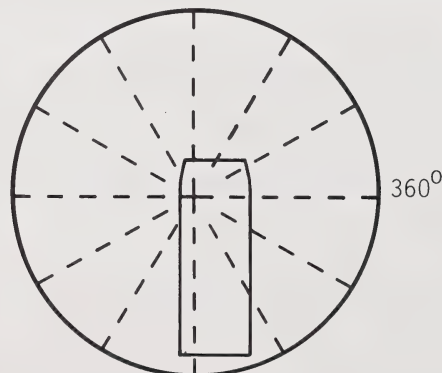
## Zone of Awareness

Many drivers are content to limit their awareness to the things they can observe by looking through the windshield, with an occasional glance in their rearview mirror for good luck.

A defensive driver, however, realizes a hazard can develop from any angle and that the driver's "zone of awareness" must include a full circle around the vehicle, as well as what is above and below the vehicle itself.

While most hazards will appear from either the front, the rear, the side or corner of your vehicle, more than one driver has lost control by not being aware of the road condition under the vehicle. Other drivers have found themselves trying to explain to their insurers how they lost the tops of their campers, buses or trailers by not being aware of height restrictions in parkades or underpasses. Overhanging eaves, tree limbs or wires are other examples of what is above you and which could cause a collision if the driver is unaware.

Remember, the earlier a potential hazard is detected, the more time you have to avoid any problem that develops. Therefore, your zone of awareness should be as wide as possible for the circumstances.



## Searching for Clues

When we drive we tend to think we can only detect potential hazards through the use of our eyes. This is, of course, not true. While our vision is undoubtedly the single most effective hazard detector we can employ, we, as drivers, can not afford to ignore the messages we receive through our other senses.

Before we move on to discuss our use of vision, let's briefly examine the role our other senses can play in our "search for clues".

### Hearing

The sound of car horns, train whistles, children playing and the sound of other vehicles braking are all examples of messages we receive through hearing and which could indicate the presence of a potential or real hazard.

Listening to the sounds of our own vehicle can help us identify maintenance problems that could lead to collisions if left unattended. For example, a high pitched squeal or grinding sound when you apply your brakes is a message that must not be ignored.

To gain the greatest advantage of your hearing as a hazard identifier, your hearing should not be impaired by playing the stereo or radio at a volume that is excessively loud, nor should in-vehicle conversation be allowed to "get carried away".

## Feel

When we talk of "feeling" something, we are really describing our sense of touch. As we drive, our bodies are in contact with various parts of the vehicle; our hands on the steering wheel, our bodies in the seat and our feet upon the pedals. The vibrations caused as the wheels roll over the road surface are transmitted through the vehicle to our bodies. These vibrations can tell us much about the surface of the road itself and how well our vehicles are "holding the road".

## Smell

Can your nose really warn you of a potential driving hazard? The answer is yes, but the signals tend to be more subtle and you must learn to interpret with more imagination. The smell of burning grass, for example, could indicate a vision problem further down the road if heavy smoke is blocking the view.

As you drive, use all of the signals you receive through the various senses to help you to recognize early the presence of any potential hazard.

Now let's examine the major source of driver information . . . the eyes.



## Vision

Have you ever driven into a heavy fog bank at night? Do you remember the feeling of discomfort as you did so? Why are some people afraid of the dark? The reason we tend to feel less comfortable in these situations is that we can not see as well and our "zone of awareness" has become restricted. We no longer feel fully in charge of what is happening, or what could happen.

Good vision and good visual habits are essential to safe and defensive driving. Vision can change so gradually that it is easy to be unaware of a vision problem. Make it a practice to have an eye examination on a regular basis.

There are two interesting facts related to vision about which you should be aware as they can effect your safety as a driver. They are:

1. As your speed of travel increases, there is a corresponding reduction in your peripheral vision (i.e., side vision). At a standstill, most persons while looking straight ahead can still see objects appearing to the side without shifting their gaze. This gives us a range of vision covering approximately 180 degrees. At highway speeds, this range of vision is reduced so that the effect becomes somewhat like driving through a tunnel where you still see straight ahead but your side vision is limited.

2. We tend to turn toward whatever we look at. We use this tendency to help us drive around curves by focusing our gaze well ahead to the point we wish to reach. If, however, we were to focus our attention on an off-road object, ahead and to our right, we would find ourselves gradually turning toward that object and if we did not react in time we would drive off the road. Because of this tendency it is important that we not concentrate our gaze solely on any specific point or object.

### Visual Habits

Continuously scan surroundings on and off the roadway, shifting your gaze frequently. Look well ahead in the lane to focus distance relative to the vehicle's speed and the roadway location. Specifically,

- focus at farther distances as your speed increases;
- view the road ahead one full block in a city;
- focus at farther distances down the road in rural areas than you would in urban areas.

(In terms of time, you should focus your gaze at a distance that is approximately 12 seconds ahead of your present position. If you use this rule, the distance is automatically adjusted to the speed you are travelling.)

Avoid fixing your eyes on the road surface immediately in front of the vehicle.

Develop the surveillance habit of scanning 360 degrees around the vehicle, and as you shift your gaze remember to include your dashboard instruments.

At night, when meeting an oncoming vehicle with bright headlights, shift your gaze well ahead and toward the right hand edge of the roadway. This will help to prevent the glare from temporarily blinding you. To lessen the glare caused by bright lights appearing from behind you, use the glare reducing setting on your rearview mirror. Also remember, bright light through clean glass causes less glare than when the glass is covered with a film or specks of dirt. Keep your vehicle windows clean.

Maintain an unobstructed view. In a moderate number of cases, collisions occur at intersections where vision is obstructed or limited by buildings, vegetation, parked cars, or obstruction of view through your vehicle windows.

Roadside features that obscure your vision at intersections should be treated as if they were traffic lights and signs requiring you to stop. By stopping, you have an opportunity to study the traffic situation more carefully before proceeding, rather than haphazardly continuing.

Observe and note the actions of other drivers. Collisions related to overtaking vehicles have been caused frequently by the driver's failure to note the actions of vehicles ahead. For example, many crashes are caused by a driver's failure to note traffic stopped ahead for a left turn. Another cited cause is failure to check traffic in the adjacent lane.

Know the demands imposed on you when driving in urban or congested areas. Visual demands on the driver appear to be about three times as great in the city as at higher speeds on a modern divided highway. The greater need for surveillance in the city is partially due to the greater concentration of other vehicles. Traffic controls and pedestrian traffic also contributes to making city driving a difficult task.

## DETECTING AND INTERPRETING CLUES

### Parked Vehicles

Driving alongside parked vehicles is potentially hazardous because your view is limited. Hazards appear when there is little time or space for evasive action.

Three key sources of hazards are:

1. The spaces between parked vehicles through which pedestrians and animals may dart into the street;
2. The parked vehicle that may suddenly move into your path; and
3. Occupants of parked vehicles who may open the vehicle doors to get out without first checking the traffic situation. Positioning your vehicle at least 1 1/2 metres (4 feet) out from the parked vehicles will place it beyond the arc of a door being opened.

Usually there are clues from parked vehicles of impending entry into a driving lane. Among the clues you will find useful are:

- Exhaust fumes These indicate the engine is running. The vehicle may soon be put into motion.
- Back-up lights. For these lights to be activated, the ignition must be on and the gearshift lever in reverse. The appearance of back-up lights is often followed by a shift to a forward gear and a forward movement of the vehicle.
- Brake lights. Most drivers depress the brake pedal, thus activating the brake lights, just prior to shifting to a forward gear.
- Front wheels. The direction toward which the front wheels are pointed may indicate whether the vehicle is ready to leave the space or still manoeuvring into a good position for leaving.
- Steering Wheel. The steering wheel of vehicles parked to the right of your vehicle can be seen from some distances. If a steering wheel is not visible, it may mean the driver is behind the wheel and may be planning to move into traffic.

## Roadway Hazard Clues

Roadway hazards are those which pertain to the condition of the road itself and, basically, fall into four categories:

1. Sight distance limitations;
2. Manoeuvring limitations;
3. Traction limitations; and
4. Traffic conflict points.

### **Sight Distance Limitations**

Usually your vision will be restricted on a roadway due to the existence of curves, hills or dips. You should take the following precautions when confronted with these limitations:

- Watch the road ahead for indications of a curve.
- When approaching a curve, estimate a safe speed (if not posted) from the degree of curvature and banking.
- Watch the road and roadside conditions (e.g., trees and poles) for signs of hills.
- In approaching a downgrade, identify a grade which is steep enough to require downshifting.
- Identify the presence of dips which may obscure another vehicle.

## **Manoeuvring Limitations**

Driving a larger vehicle in certain situations can be more hazardous than for an ordinary automobile because of the larger vehicle's manoeuvring requirements. Compensate for these requirements whenever you detect:

- Narrow or narrowing lanes;
- Roadway construction that is difficult to perceive clearly; and
- Gravel or dirt road surfaces which have been rutted by the travel of other vehicles.

## **Traction Limitations**

The defensive driver learns through experience to "feel the road" with his vehicle. Be on the lookout for rough surface roads which have:

- Surface irregularities on asphalt and concrete, such as potholes, frost heaves, cracked pavement, etc.;
- Wooden surfaces (such as small bridges) containing cracks, holes, and protruding nails; and
- Washboard conditions (i.e., continuous ruts).

Many municipal district roads are also notorious for their extreme slipperiness after even the smallest amount of rain. The clay base of these roads renders them like a bar of soap to drive on when wet. Exercise extreme caution and be constantly aware of when your wheels are slipping. Other traction limitations resulting in reduced friction include:

- Oil or grease spills;
- Snow or ice, particularly in shaded areas such as underpasses; and
- "Black ice" caused by freezing temperatures following a rainstorm.

### **Traffic Conflict Points**

Traffic conflict points are those points on a roadway which require vehicles to merge, intersect, cross paths, etc. The conflict arises because two or more vehicles approaching from different directions are "competing" for the same space on the roadway. Examples of such conflict points include intersections, acceleration and deceleration ramps on freeways, parking lots, and merging lanes at bridges and hilltops.

Some of the special hazards connected with freeway driving are worth noting:

- If driving on an entrance ramp, be alert for vehicles which are stopped or slowing down on the on-ramp.



- If driving on a long entrance ramp with an acceleration lane that continues on as an off-ramp or deceleration lane, be aware that vehicles may leave the main roadway and cross over to merge onto the acceleration lane. Out-of-province drivers may be unfamiliar with exits and merge at the last moment.
  
- When approaching and entering an off-ramp:
  - Be alert for vehicles entering the deceleration lane: if that lane is also part of the acceleration lane for vehicles entering the roadway;
  - When nearing the end of the off-ramp, look for other vehicles which may be stopped or waiting in line at the end of the off-ramp.
  
- When approaching and passing interchanges on the freeway, note vehicles in the deceleration lane swinging back into the lane at the last moment.

### Detecting Other Driving Hazards

In addition to the "roadway hazards" cited earlier, there are also single vehicle hazards, multiple vehicle hazards and a variety of other road user hazards. These will be dealt with briefly, as it is important for you to understand the background to these hazards.

## Single Vehicle Hazards

As the name implies, these hazards have been classified as single vehicle because they involve the motion of an individual vehicle. There are many reasons why another driver may present a hazard to you, such as his inattentiveness to his driving, loss of control, or his failure to communicate his intentions to you. The following clues from the other driver demand that you give him an extra wide berth when you detect them:

- Frequent lane changes, suggesting inattentiveness, indecisiveness, or alcohol impairment;
- Frequent speed changes when conditions do not require it;
- Failure to signal driving intention;
- Quick, jerky stops as opposed to a gradual deceleration in non-emergency situations;
- Out-of-province licence plates, which suggests that the driver may be unfamiliar with road conditions and directions;
- Failure to adjust to dangerous driving conditions, such as heavy rainfall or icy roads;
- Failure to respond appropriately to your signals of intention (e.g., overtaking you too quickly when you decelerate for a stop);
- False signals (e.g., a driver who has been displaying a turn signal over a long period of time); and
- Special vehicles (e.g., slow-moving farm tractors, emergency vehicles, vehicles required to stop frequently).

It's not important that you know this list of hazards - indeed there are many others that you can probably think of which have not been mentioned. What is important is that you learn to spot a potential hazard and estimate its seriousness, giving yourself a good basis for taking appropriate action.

### **Multiple Vehicle Hazards**

As well as single vehicle hazards, you must also learn to detect multiple vehicle hazards. Such hazards are typically formed at "traffic conflict points" (as discussed previously) where traffic converges or intersects, and on highways characterized by high traffic volumes. Due to the high volume of traffic usually found in such situations, hazards are frequently compounded because visibility can be restricted by the other vehicles present. Be aware and adjust your speed and position accordingly.

## Other Road User Hazards

Driving is often made more hazardous by the presence of other road users (besides motor vehicles), including pedestrians, cyclists, joggers and animals. In most cases, these other road users won't be out in the main flow of traffic, but their proximity to the road line seldom guarantees this. Clues to these hazardous situations include:

- **Position** of the road-user relative to roadway
  - pedestrians or joggers on the shoulder;
  - cyclists travelling on road edge or shoulder.
- **Motion** of the road-user
  - Pedestrians running toward roadway;
  - Children at play; and
  - Cyclist approaching from side road.
- Road-user's **Ability to See**
  - Pedestrian's vision obscured by umbrella, etc.; and
  - Driver stepping out from parked vehicle while your vehicle is in "blind spot".
- **Attentiveness** of road-user
  - Child chasing ball; and
  - Pedestrians engaged in heated conversation.
- Road-user's **Lack of Control**
  - A motorcyclist turning on a slippery surface, loose gravel.

It is important to realize that the various types of hazards discussed above have been categorized for purposes of presentation only. In an actual driving situation, they frequently arise in combination, requiring split-second thinking and action on your part.

## COLLISION AVOIDANCE

### Commentary Driving

One of the best methods of hazard detection you can practice is the widely used method known as "commentary driving". Basically, commentary driving is a technique whereby the driver "speaks" out his main observations and interpretations of the events that are developing around his vehicle. It is, of course, not necessary that you speak "out loud" to yourself when you practice this technique, but "speak" silently and practice regularly so that "real observation" becomes a habit.

Some examples of commentary driving include:

- "Open intersection; reduced visibility; speed 40 km/h; following car is tailgating...";
- "Signal light is stale green; oncoming car signalling left; walk light flashed off; pedestrian starting to cross...";
- Crowned road; narrow shoulder; upgrade ahead; passing car accelerating; no passing signal; following car drifting toward centre line..."; and

- "Parked cars OK; car approaching from left is stopping; cyclist on the right is looking away...".

Commentary driving is extremely useful when carried out properly because:

1. It creates an awareness of the vast number of things a driver should be watching for and thinking about;
2. It assists the development of good seeing habits and helps the driver resist common distractions; and
3. If done aloud with an instructor present, it helps the instructor evaluate student progress and instructor effectiveness.

Having observed the events happening around you, the next step is to decide which event(s) could lead to a "hazard" situation. Again, practice this identification using the commentary approach.

The third step in the process is to plan your best escape if the hazard actually occurs and to take all reasonable precaution. Again, "talk" to yourself about the plan.

Let's follow one **example** all the way through the process.

**Observation Commentary:**

Speed is 50 km/hr, cars are parked on both sides of the street, no other vehicle traffic is in sight front or rear, there are no side intersections, children are playing ball one half block ahead on the right and road condition is good.

**Potential Hazard Identification Commentary:**

Child could run into street from between parked cars.

**Precaution/Escape Commentary:**

Reduce speed now, be prepared to brake. If child runs out from right, apply brake and turn left into oncoming traffic lane. Worst case situation, hit parked vehicle instead of child.

The example quoted is a very simple case. Imagine how this situation would have been complicated if there was oncoming traffic, or a car behind you was signalling its intent to pass.

If you practice this approach regularly, you will be better prepared when and if a genuine emergency escape is required.

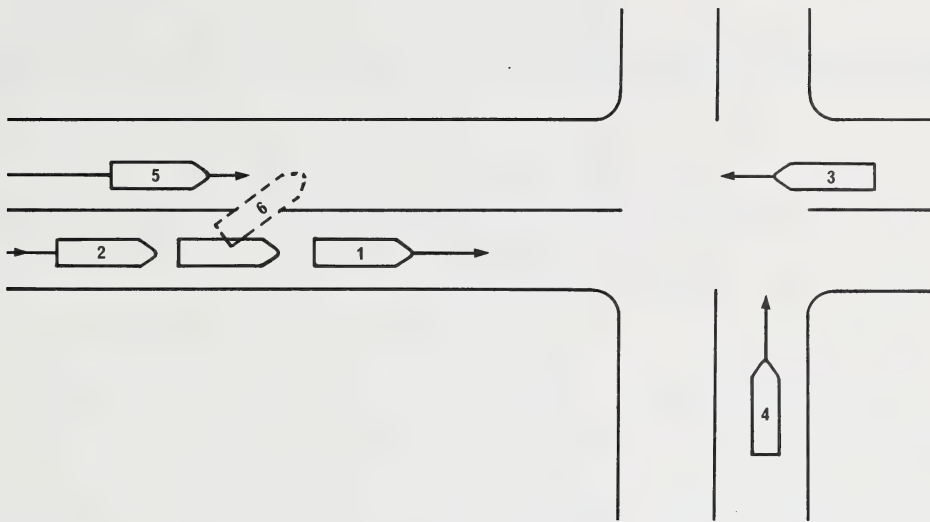
To this point we have covered the general topic of detecting driving hazards and introduced a few key methods of detecting and avoiding common hazards. We now want to get more specific and deal with COLLISION AVOIDANCE, with the main emphasis on avoiding the two-vehicle collision - perhaps the most serious of traffic mishaps. However, single vehicle collisions and other types of collisions are also dealt with.

Perhaps the most useful way to analyze and understand the two-vehicle crash is to consider such crashes according to the positioning of the vehicles before the crash occurred. There are only six positions that another vehicle can take in relation to yours before a crash. By studying these six positions, learning the hazards associated with each and the defenses against them, you can avoid being in most two-vehicle crashes.

The following diagram illustrates each of the six positions that the other vehicle can assume relative to your own. They include:

- #1 - vehicle ahead
- #2 - vehicle behind
- #3 - oncoming vehicle
- #4 - intersection or angle
- #5 - another vehicle passing you
- #6 - you passing another vehicle





We will be examining each of these types of collisions in the following sections, as well as the "mystery crash", the "non-collision", run-off-the road type of crash.

## COLLISIONS WITH THE VEHICLE AHEAD

Rear end collisions are just about the most common type of traffic crash. Roughly 55% of all daytime collisions involving commercial vehicles are rear end collisions.

Why do collisions with the vehicle ahead occur?

Well, they may be a variety of hidden reasons, such as driver inattentiveness, being distracted, etc., but they all boil down to DRIVING TOO CLOSE to the vehicle ahead. When he is required to stop, for whatever reason, you must be able to as well. And if you drive a larger vehicle, such a bus or truck, there is a very good chance that it will take you longer to bring your vehicle to a full stop than it will the motorist in front of you.

There are two basic defenses against this type of collision: (1) stay alert, and (2) allow a safe following distance. Car drivers should follow the 2 second rule of following and drivers of larger units should not be closer than 4 seconds to the vehicle ahead. These distances should be lengthened when road conditions are slippery. If you are unsure as to how these following distance rules work, check your driver handbook or ask your instructor.

When following other vehicles, develop the habit of frequently asking yourself "Could I stop in time if I had to?"

Remember, no vehicle can "stop on a dime" and the distance you will travel before you stop is a combination of how far you travel:

- before you react (approximately 3/4 of a second); and
- after the brakes have been applied (braking distance).

If you drive a vehicle equipped with air brakes, a third factor must be added and that is the time it takes the air to travel through the lines and apply brake pressure. This is called "lag time" and adds another fraction of a second to the time it takes to stop.

The greater your speed, the further your vehicle will travel during each of these braking factors and poor road conditions add to your braking distance as well.

### **Avoiding the Head-On Collision**

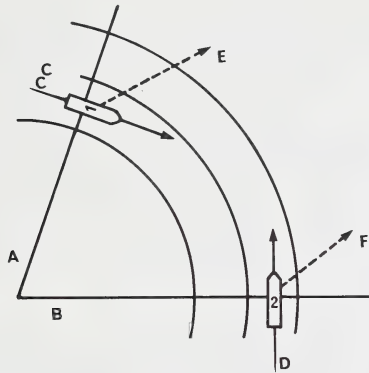
One of the first rules of the road that we learn in this country is that you are expected to drive on the right half of the road. There are times, such as when passing, when it is permissible to venture to the left side, but these are specific instances only. If everyone carefully abided by this rule, there wouldn't be head-on collisions.

Circumstances do arise, however, in which you or an oncoming driver cross "centre" and find yourselves on the path of disaster. Some of these circumstances are driver-caused, but some are not. Let's briefly consider some of the reasons why another driver would be in the wrong lane. Being consciously aware of the reasons makes it much more likely that you will be able to anticipate the potential collision and successfully avoid it. The reasons include:

1. A problem in his lane. A driver may come upon some obstruction in his lane (e.g., a construction barrier, pedestrian, animal, cyclist, pothole, etc.) and automatically swing left to avoid it.
  
2. Faulty driving manoeuvres. Through some error of judgement a driver may manoeuvre his vehicle poorly, cutting into your lane of traffic. For example:
  - making a wide right turn (frequently necessary in large vehicles with a long wheel base);
  - making a left turn at an intersection;
  - misjudging the distance required to pass a vehicle.

If you drive a vehicle that has an extended wheel base, the point about turning right deserves extra attention. As a general manoeuvring rule, take any additional space needed out of the street being entered.

3. Centrifugal force on curves. Centrifugal force is that force which acts on your vehicle to keep it going in a straight line when you are negotiating a curve. The outward arrows in the following diagram illustrate the centrifugal force acting on the two vehicles.



If driver #1 allows centrifugal force to push him across the centre line, and the oncoming driver overcompensates, a sideswipe or a head-on collision could result.

What is the best way to take a curve? Slow down before you enter the curve. On right curves, keep the front of the vehicle close to the left of the line and closely watch the right hand mirror for the position of the rear of the vehicle. On left curves, keep the front of the vehicle to the right of the lane, watching the left mirror. Apply power to the wheels when in the curve (not before you go into the curve!).

Why apply power to the wheels when taking a curve? It cuts down the effect of centrifugal force. It works like this: when you apply power to wheels, you introduce a force in a different direction than the pull of centrifugal force. The result is greater control.

4. Loss of control. Drivers can lose control of their vehicles for a variety of reasons, including:

- right wheel dropping off pavement and the driver overcompensates in making a recovery;
- loss of visibility; centre line obscured or worn away;
- falling asleep at the wheel; alcohol or drug intoxication;
- tire blowout; skidding on slippery surface.

When these circumstances arise, what can you do to avoid hitting head-on?

The following four point prescription has been developed for just such circumstances. Learn it, remember it, and practice it to avoid the "head-on":

**Rule Number 1 is "Read the Road Ahead"**

Be aware of oncoming traffic. Try to anticipate what problems the oncoming driver is going to have that might cause him to become your problem.

## **Rule Number 2 is "Ride to the Right"**

Don't crowd that centre line. Give it plenty of room.

If there are two lanes of traffic moving in each direction, use your right lane as a matter of preference and habit. This keeps you away from the centre line. Also, traffic in the right lane usually moves with fewer interruptions than traffic in the left lane, because vehicles turning right cause less delay than vehicles turning left.

This doesn't mean that you can't use the lane nearest the centre line. When you do, however, give that centre line plenty of room while staying in the centre of your lane.

## **Rule Number 3 is "Reduce Speed"**

When you see a threat developing, (for example, an oncoming vehicle that may move into your lane for some reason), reduce your speed. This means to slow down right away. Also, sound your horn or flash your lights to warn the erring driver if you think he has not seen you.

By slowing down, you may give him time to get back into the proper lane and avoid a head-on collision. Continue slowing down and preparing to stop until the situation clears.

#### Rule Number 4 is "Ride Right of the Road"

If you have followed the first three steps by reading the road ahead, keeping to the right and reducing speed, and he still keeps drifting across the road into your path, you have only one out left - to ride off the road where practical. This action probably will be better than a head-on collision. Never try to out-guess the other driver by pulling to the left.



## THE INTERSECTION COLLISION

About one-half of all two vehicle collisions occur at intersections. This is largely due to the traffic conflict which exists at intersections, both vehicular and pedestrian. This constant conflict makes being prepared for the unexpected the order of the day.

Here are a few hazard clues peculiar to intersections which you should guard against:

- The stale green light. The green light that has been visible for a block or so and may change at any second.
- The vehicle in the left lane, waiting behind the turning vehicle. He may get impatient and, without warning or signal, swing over in the right lane to get around.
- The vehicle sitting at an intersection when the light is green. Be suspicious - he may be waiting for oncoming traffic to clear. An oncoming vehicle turning left could cross into your lane or another vehicle could be passing through the intersection.
- The driver making a turn. He may have signalled, moved out, and then, for some reason, he suddenly stops, putting you on the spot.

The proper way to negotiate intersections can be described by four words which carry a lot meaning: KNOW, SLOW, SHOW AND GO.

**KNOW** Drivers do unexpected things at intersections, so expect the unexpected;

In advance what you want to do at the intersection. Your indecision can confuse other drivers and cause a collision;

The rules regarding yielding; and

That at intersections, you can only proceed when your judgement tells you it is safe to do so. Be prepared to YIELD at all times.

**SLOW** Slow down gradually - an intersection is not a place for speed. Remember, at 25 km/h you cover over 7 metres per second and may use up 5 metres of valuable space in just moving your foot from the accelerator to the brake.

**SHOW** Signal your turn well in advance to let other drivers know your intentions and be in the proper lane.

**GO** Get through the intersection without hesitation or over-caution, so as not to confuse other motorists.

It's important to keep in mind that the hazards surrounding intersections are also present in other locations, such as driveways and private roads which enter onto highways. And many two-vehicle collisions at intersections result from the distraction of other hazards: pedestrians, cyclists and animals. Beware!

To conclude this section, here are some rules which should guide your behaviour at all intersections.

1. Never assume that the other driver will yield. Approach each intersection with your foot off the gas and posed over the brake pedal.
2. As you approach an intersection, look first to the left to make sure other traffic is yielding, then to the right. When you are near the intersection, check again for unusual or unsuspected action to either side.
3. Proceed ONLY when you can see that it's safe, even if you do have the right of way. You can't count on the other driver always obeying the rules. For instance, you are waiting at an intersection for the traffic light to change, the light changes to green. Do not proceed until you have checked left and right to be sure the side traffic has stopped.
4. Do not change lanes while in an intersection.
5. Do not pass a vehicle stopped at an intersection until you have ensured it is not stopped to allow a pedestrian to cross. Do not assume the vehicle stopped at the intersection and signalling a left turn is only waiting for oncoming traffic to clear. There may also be a pedestrian crossing the roadway.

## BEING PASSED BY ANOTHER VEHICLE

As a driver, you are aware that many motorists would rather drive in front of you than behind you.

Some of these drivers will become impatient and take risks, such as:

- tailgating - staying too close behind your vehicle and then darting out to see if a pass can be made;
- following the leader - a series of cars passing you at the same time, even though the second and subsequent cars have extremely limited visibility.

When drivers take such risks, it creates the potential for involving you in three types of collisions: (1) the sideswipe; (2) the cut-off, and (3) being run off the road.

As a defensive driver, what can you do to help the motorist who is or may be attempting to pass you?

Do not get upset when other drivers want to pass . . . make it easy for them to do so. Remember, you're not only trying to keep them out of a collision, but you are also protecting yourself.

**Keep right** in your lane so that the person wanting to pass has a good view of any oncoming traffic.

**Leave space** between your vehicle and the vehicle ahead so that anyone passing has room to pull in without cutting you off or having to pass two or more vehicles at one time.

**Slow down** when you are being passed to ensure the passing vehicle can safely return to the right hand side of the road.

**Pull off** if you are driving a slow moving vehicle and the traffic is lining up behind you. Look for a safe spot to pull off the roadway - do so in safety and proceed only after traffic has cleared.

**Let the other driver decide.** Under no circumstances should you indicate, in any way, to the driver behind that it is safe for him to pass.

**Communicate** your intentions to the vehicle(s) behind you should you intend to change lanes or turn off the roadway. Check and signal well in advance to provide adequate warning.

## THE ART OF PASSING

Passing another vehicle is the last of the "six positions" in which you can be involved in a two-vehicle collision.

Why do you pass another vehicle in the first place? Well, usually you figure the other driver is moving too slowly and is holding you up. But do you really gain much by passing him? In reality, very little! How often do you notice a car you've passed pull up beside you at the next stop light? And passing tends to put needless wear and tear on your vehicle and increases fuel consumption significantly.

Admittedly, there is nothing wrong with passing another vehicle so long as it is done where it is safe and legally permissible to do so. But, we want you to realize at the outset: YOU GAIN LITTLE, IF ANYTHING, BY PASSING.

Since, at some time, passing will be necessary, let's consider the proper way to do it. The Canada Safety Council advocates a method known as the thirteen points to perfect passing, which outlines clearly how a good pass is made. That may seem like a lot to remember, but they're easy once you think them through. Here they are:

1. Is this pass necessary?

You may not need to pass at all and, rather than take a chance and break the tempo of traffic, it might be better to continue along as you are. Before attempting any pass, the defensive driver will always ask himself: "Is this pass necessary?" If the answer is NO, then he doesn't pass.

2. Stay back and maintain safe following distance

Too many drivers forget what they have learned about following distance when they start the passing manoeuvre. They creep up behind the vehicle ahead so they can dart out into the left lane as soon as an opening occurs. This is hazardous because the vehicle ahead may stop suddenly. Also, the closer you get to the vehicle ahead, the less you can see.

3. Check ahead

You need to know if oncoming traffic is using the left lane, since that is their lane. Check also for anything else that might interfere with your passing manoeuvre. If there is another car coming from the opposite direction, you've got to decide whether you have the time and passing distance you need to get into the left lane, pass the vehicle ahead, and get back into the right lane before this vehicle reaches you.

#### 4. Check traffic behind

Don't move left until you know what's behind you in the event that someone is overtaking your vehicle. Use the mirrors and shoulder check sequence to check both sides and the blind spot.

#### 5. Accelerate

Build up to an adequate speed to ensure a safe pass in the space available. You can still change your mind at this point, if necessary.

#### 6. Signal left

Use your signal lights to warn traffic behind you what you intend to do. A good driver in the vehicle ahead will also be aware of your signal. Check over your left shoulder.

#### 7. Move left

Now you are really committed; you are in the passing lane and it is your responsibility to make a safe pass. Ensure you have centered your vehicle in the lane and that you have provided clearance for the vehicle being passed.



8. Gently tap your horn

Tap your horn just before you reach the other driver's blind spot. Use common sense here. It isn't always necessary and may create confusion in heavy city traffic. However, if you see that the vehicle you are overtaking is drifting or weaving in its lane, use your horn.

9. Check behind

When you have partially passed the other vehicle, you could have speeded up a bit, thereby complicating your return to your normal lane. At a certain point, he may disappear into your offside blind spot.

10. Signal right

Signal your intention and check over your right shoulder and right outside mirror.

11. Move right

Now move smoothly back into your normal driving lane, checking your mirrors to be sure it is safe and to be certain that you have sufficient space behind you to do so.

12. Cancel your signal

### 13. Adjust speed

Now that you have regained your position in the lane, adjust your normal cruising speed. The main point here is not to move back into the driving lane and immediately drop back on your speed.

There you have it - the thirteen points of a perfect pass. Each one is important and you should cover them mentally every time you prepare to pass another vehicle.

### THE MYSTERY CRASH

The "mystery crash", so named because it is difficult for police authorities to determine its cause, is that type of crash in which the driver, for some reason, loses control and runs off the road into an embankment, tree, abutment or other fixed object. This type of collision has a very high mortality rate.

The key to this type of collision is the driver's loss of control. By control, we usually mean the driver's ability to steer and to stop his vehicle. Although stemming from a variety of causes and contributing factors, loss of control frequently follows "driving too fast for prevailing conditions".

Driving too fast for prevailing conditions sounds like a nice catch-all, but what it really means is too fast, with respect to one or more of six conditions.

## 1. Light Conditions

- Overdriving your headlights at night. The average headlights are only capable of illuminating the highway for approximately 100 metres. Consequently, if you drive more than 80 km/h at night, it's unlikely you will be able to stop in time should you have to;
- Suffering from headlight glare at night. The human eye takes about 7 seconds to recover from headlight glare. At 80 km/h, you would travel 160 metres in those 7 seconds;
- Suffering from sunglare in the morning or late afternoon, or from glare on a bright winter day. Be sure to keep your windshield clean and wear sunglasses to protect your eyes.

## 2. Weather Conditions

- Driving rain, snow, sleet and fog all contribute to loss of vehicle control. They are doubly dangerous, however, because they reduce other drivers' ability to see you clearly. Reduce your speed, drive with your headlights on and, if conditions get bad enough, don't drive at all.

## 3. Road Conditions

- Curves, crowns, dips and inclines all limit the speed at which you can drive your vehicle.

#### 4. Traffic Conditions

- Some drivers think that the good driver is one who can weasel his way out of tight spots by quick manoeuvres. Many run-off-the-road collisions probably reflect the deliberate choices of some "escape artists" who took a chance once too often. The defensive driver looks far ahead, anticipates traffic situations, uses good judgement, and avoids getting into tight spots in the first place.

#### 5. Vehicle Conditions

- Bad tires finally blowing out at high speeds;
- Bald tires unable to grip the road on a bad curve; and
- Defective brakes, etc.

#### 6. Driver Conditions

- Driving requires both mental and physical sharpness. Physically, you are highly dependent upon your vision directly ahead, as well as your peripheral vision, which acts as a warning device for events happening around you;
- Driving demands that you keep your eyes moving - scanning the road ahead, and to the left and the right of the roadway. Every few seconds, check your rearview mirrors to be aware of any vehicles that may be following or trying to pass;
- Sometimes your attention is focused not on the outer world but on your inner world: the world of your mind. Your eyes are wide open and you are

looking at the road ahead, probably with a more or less fixed stare, but your attention is really turned inward, where you are grappling with a particular problem or merely day-dreaming. Again, keep scanning the environment to keep your focus shifting. And, make sure you are well rested before beginning your trip;

- Driving while under the influence of medication. Drugs serve a useful purpose when they are prescribed by a physician. But, when your doctor prescribes any of these, you should discuss with him what effect, if any, they have on your driving ability and whether you should drive at all when under such medication;
- A high percentage of drivers involved in fatal crashes have been drinking. That is why many employers in Canada forbid driving within 8 hours of consuming alcoholic beverages.

Summarizing briefly, keep in mind these points about the "mystery crash".

1. It can happen to anyone - even you.
2. It is a very severe type of crash. Fatalities are frequent and injuries are usually very serious.
3. It is the most preventable type of crash because it involves maintaining control of yourself and your vehicle.
4. The major cause of this type of collision is driving too fast for conditions. So, keep your speed down, start slowing down sooner, and always adjust your speed to conditions of light, weather, road, traffic, vehicle and driver.
5. Be sure of your own physical and mental fitness to drive. You can't control your vehicle if you are not in control of yourself.

## OTHER TYPES OF COLLISION

We have focused on avoiding the two-vehicle collision and the single vehicle mystery crash. These are not the only types of collisions you could be involved in, but they were stressed because of their seriousness and frequency of occurrence. No less important are the collisions which you may incur with pedestrians, fixed objects, bicyclists, animals, etc.

There are no magic formulas for avoiding these types of collisions, but the points of defensive driving covered in previous sections are equally applicable. Be alert and aware of the hazards, and be sure of your own mental and physical fitness to drive. Always keep in mind the defensive driving formula:

1. Know the hazard;
2. Understand the defense; and
3. Act in time.

OBJECTIVE

Be able to correctly answer a series of questions concerning the techniques you would employ to deal with the following types of emergency driving situations:

- Skidding
  
- Tire blowout
  
- Loss of brakes
  
- Loss of visibility
  
- Obstruction in the roadway

## INTRODUCTION

Good drivers don't rely on their skill to get them out of tight spots - they depend on their judgement to avoid them. It's a lot easier to stay out of tight spots than to get out of them.

Most of us learn to drive under favourable driving conditions and, if we practice defensive driving, can, hopefully, avoid those tight spots. However, the odds are that, at some time, we will all be confronted by an emergency situation which demands split-second clear thinking and evasive action. It's not practical for you to go out and deliberately put yourself in emergency situations so you can practice getting out of them. But you can, and should learn the proper techniques for dealing with emergency driving situations to prepare yourself for them when they do occur. When they occur, it's too late to learn!

In this section, you will learn how best to deal with each of the following emergency driving situations:

- Skidding
  
- Tire blowout
  
- Brake loss
  
- Obstruction in the path of your vehicle
  
- Sudden loss of visibility



The procedures in this section are "last ditch" measures to avoid a crash, if at all possible. Since it is impossible to completely eliminate human error in the performance of routine driving tasks, your ability to take appropriate and immediate action under emergency conditions becomes critical.

## SKID CONTROL

Any number of factors can cause a vehicle to go into a skid. During a skid, the tires lose proper traction on the road surface. The normal means of controlling the vehicle are affected - steering, braking, decelerating and accelerating. You must be able to detect a loss of traction in time to maintain or regain control. Loss of traction may include:

- Skids caused by tire failure, resulting from underinflation or sudden deflation from a blowout;
- Front wheel skids resulting from faulty brakes;
- Rear wheel skids resulting from faulty brakes, excessive acceleration or speed on curves, rough or slippery surfaces;
- Four wheel locked brake skids resulting from inappropriate application of brake pressure;
- Hydroplaning, resulting from travelling too fast on a water-covered roadway, with lack of attention given to tire tread and pressure; and
- Skids caused by oil on the road after the first few minutes of rain.

Once you lose traction and your vehicle goes into a skid, the correct way to regain control is:

1. **Steering**

Turn your wheels in the same direction the rear of the vehicle is skidding. Be careful - don't oversteer! You'll be able to feel "when" the vehicle regains traction. Then, straighten the wheels.

Watch out, though! Frequently, a skid in one direction is followed by one in the opposite direction (often caused by oversteering while in the first skid). As the vehicle fishtails in the opposite direction, steer in the direction of the new skid.

The correct steering procedure is illustrated in the following diagram (read bottom to top).



Steering control is re-established.

To control fishtailing in the opposite direction, you'd countersteer right to help you get back on course.



The back end fishtails to the right.



The vehicle is back on course.



You'd steer left, in the direction you want the vehicle to go relative to the way it's facing.



The back end of vehicle skids around to left (the vehicle is still moving forward on angle).



The vehicle is going straight.



## 2. Braking

Never hit the brakes during a side skid. After you feel the vehicle regaining traction, the best way to slow or stop, without causing a further skid is to pump the brakes with hard, rapid jabs, alternately applying and releasing the brakes.

A couple of other points about regaining control in a skid:

- Deceleration: remove pressure from the accelerator smoothly - not suddenly.
- Acceleration: do not accelerate until steering control is re-established. Once re-established, shift to a lower gear and accelerate gradually to maintain traction.

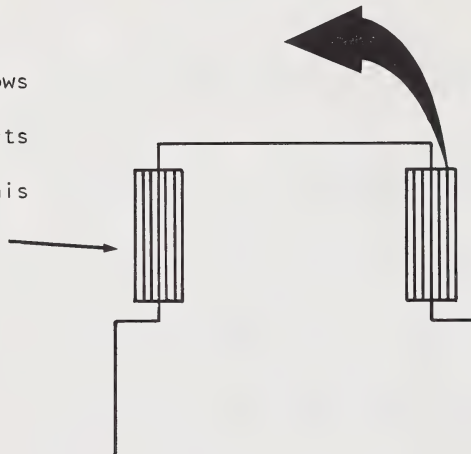
As with any emergency situation, the important thing is to avoid panicking or over-reacting. Respond consciously and deliberately at all times.

## TIRE BLOWOUT

Equally as frightening as going into an uncontrolled skid is a tire blowout.

If one of your front tires blows, there will be a strong pull in your steering toward the side with the blowout. A back tire blowout on your vehicle may or may not cause the back end to swerve.

Left front tire blows out. The rubber acts like a brake on this side.



The right front tire has no braking action on it. So, the bus is likely to "pull" hard to the left. You will have to grip the wheel hard to maintain steering in a straight line.

When it happens:

1. Grip the steering wheel firmly and steer your vehicle straight down the centre of your lane.
2. Do not apply your brakes immediately.

3. Take your foot off the accelerator. If your vehicle starts to skid, follow the skid procedures outlined previously.
4. If a quick stop is required to avoid some other hazard, brake moderately, pumping the brake pedal.
5. Activate the right turn signal, move right slowly, out of the lane of traffic, and stop. Watch out for soft shoulders which could make the control of the vehicle even more difficult.
6. Activate four-way hazard lamps.

### LOSS OF BRAKES

You are driving along the highway, you step on the brake pedal to slow down or stop - and the pedal slaps uselessly on the floor. It's a terrifying experience that will bring your heart up into your throat! What would you do?

1. Pump the brake pedal! If there is any resistance at all, you may be able to work up enough pressure to help some.
2. Sound your horn and flash your lights to warn other drivers that you are out of control.

3. Downshift to the lowest gear possible. If the way ahead is clear, allow the engine compression to slow you down and stay on the road. Try to slow the vehicle down more by gradually applying the emergency brake so as not to lock the rear wheels. As you slow down enough, select a path for leaving the travel portion of the roadway and bring the vehicle to a stop on the shoulder.
  
4. If you must leave the road to avoid a crash, select the path that will be most likely to minimize (i) injury and (ii) property damage (in that order). Look for something to sideswipe - roadside brush, a snowbank, a guard rail, even parked cars - that will slow you down. If you must go into a bank, do so at an angle to lessen the chances that the vehicle will flip over.

### LOSS OF VISIBILITY

Several things can happen to cause a sudden loss of visibility - your headlights fail, your hood flies up, mud and slush get splashed on the windshield, etc. They are all similar in that you suddenly can't see where you're going and you must attempt to stop as quickly as possible before you lose steering control or hit something. But, each is a little different as well. So, let's consider what you should do in each situation separately.



### **If the Hood Flies Up**

1. Lower your head and try to look through the gap at the hinge.
2. Look out the left and right windows to help keep your sense of direction.
3. Apply brakes moderately.
4. Activate your right turn signal.
5. Steer out of the traffic lane and stop.
6. Activate four-way hazard lights.

### **If Headlights Fail**

1. Immediately hit the dimmer switch and make sure passenger dome lights are off.
2. Activate right turn signal and four-way hazard flashers.
3. Use available environmental light to keep sight of the road.
4. Brake as hard as you can without throwing yourself into a skid. The idea is to pull your speed down quickly before a slight steering error takes you off the road.
5. Steer out of the traffic lane and stop at the side of the road.

### **If Mud/Slush is Splashed on Windshield**

1. Apply brakes cautiously, look out side windows to keep sight of the road.
2. Turn on windshield washers and wipers.

### If Windshield Wipers Fail During Rain/Snow/Sleet

1. Look out the side windows to keep sight of the road.
2. Apply brakes cautiously.
3. Activate right turn signal.
4. Pull over as far to the right as possible, or off road, and stop.
5. Engage four-way hazard flashers.

## EVADING AN OBSTRUCTION

When you suddenly see an obstruction - a pedestrian, ball, another vehicle, construction barrier, etc., - in the direction of your vehicle, you must take evasive action to avoid hitting it. Evasive action is simply the exercise of your fundamental driving manoeuvres under conditions of stress - limited time, space and distance. You must decide which of these evasive actions you should perform to avoid hitting the obstruction:

- controlled braking;
- quick steering, with or without braking;
- leaving the paved portion of the roadway, with or without roadside hazards present.

For effective evasive action, you must be able to inhibit the tendency to slam on the brakes. Generally, drivers tend to apply the brakes at the first sign of trouble. While effective in many instances, braking can lock the wheels and cause loss of steering control, making it impossible to steer away from a collision.

You may decide that braking to a stop is the best evasive action you can take to avoid the obstruction. This will depend on how fast you're going, how far away the object is, how good your tires are, and whether the road is wet or dry.

Because the obstruction is an emergency, you won't have time to do lengthy calculations. If it's not instantly obvious that you can stop in time, you must choose to steer the bus in an alternate path. You must be able to recognize quickly the best "escape route". At a glance, decide:

- whether a possible escape path is free of hazardous obstacles;
- whether clearances are sufficient to allow larger vehicles to pass through them;
- whether an off-roadway surface will permit steering control;
- whether the obstruction is likely to move into your escape path; and
- whether one escape route is safer than another.

Remember, if you focus your vision only on the obstruction, you will be unable to see any escape route. Keep the "big picture" in view.

The size and weight of a larger vehicle limits its ability to swerve sharply to avoid an object or to leave the pavement with any great deal of control. Overturning is a danger. STEER FIRMLY AND AS GRADUALLY AS POSSIBLE TO STILL CLEAR THE OBSTRUCTION, USE ONLY CONTROLLED BRAKING.

It can't be stressed enough that your decision will probably have to be a split-second one. Rehearse these points so that you can decide what evasive action is best:

- If you're travelling as fast as 65 km/h, the obstruction has to be at least 60 metres away from you to stop safely. That's 2/3 of a football field! Any closer and you'd better steer around it or off the road.
- Behind every rolling ball, there's likely to be a running child. Just because the ball clears your path in time doesn't mean you're out of danger.
- If you're in a tight spot, hitting the obstacle might be the safest thing to do. For example, with heavy oncoming traffic and heavy pedestrian traffic on the sidewalk to your right, suppose a construction warning sign is the unexpected obstacle, **less than 15 metres away in your lane. You're going 40 km/hr.** You can't stop in time, and steering left or right would create a **worse collision.** You may assess the relative dangers and decide it's better to demolish the sign.

IN ANY CASE, WHERE COLLISION IS ABSOLUTELY UNAVOIDABLE, TRY TO:

- Avoid a head-on collision; collision at an angle reduces the force of impact; and
- Avoid hitting human beings. If you have a choice, it's better to hit inanimate objects than people or large animals.

Because of the high risk of death in collisions involving trains, this segment has been added to furnish the driver with further information regarding railway crossings.

The following is an outline of statistics and facts which may be of interest.<sup>1</sup>

### Collision Statistics

- Each year in Canada, approximately 100 people are killed and an estimated 500 are injured (requiring medical attention or hospitalization) in rail/highway crossing incidents.
- The number of rail/highway crossing incidents averages about 1,000 annually.
- About 43% of all rail/highway crossing collisions occur at crossings equipped with flashing lights and bell or flashing lights, bell and gates!
- Approximately 40% of all rail/highway crossing incidents involve a vehicle striking (running into) a train.

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<sup>1</sup> Statistics and facts used in this outline are taken from Operation Lifesaver material.

- Rail/highway crossing collisions are the most severe type of highway collisions. They are at least 15 times more likely to result in death than any other collision.
- The major cause of rail/highway crossing collisions is the failure of motor vehicle operators to stop or exercise due care and caution, or to observe and comply with existing laws and regulations.
- At least 32% of the drivers involved are in the 21-30 years of age range.

### Railway Facts

- An approaching train activates flashing light signals and gates several seconds before the train reaches the crossing.
- An eight-car passenger train (and that is a short one!) travelling at 100 km/h requires 1,070 m to stop. When travelling at 130 km/h, a stopping distance of 1,825 m is required (5,987 feet).
- The average 150-car freight train travelling at 50 km/h needs 960 m (3,150 feet) to stop. At 100 km/h, the same freight train needs about 2 1/4 km to stop.
- An automobile travelling at 90 km/h requires about 70 m (230 feet) to stop.
- The average locomotive weighs 110 t.

- The average loaded box car weighs 70 t.
- The average automobile weighs 2 t.

When one considers the aforementioned facts and figures, it becomes quite obvious that something needs to be done to solve the problem on hand.

One way of doing this is to make drivers (and the public in general) aware of the **three E's (Education, Engineering, Enforcement)**, as they apply to rail/highway crossing safety.

The first phase (and most important) is Education. The second phase is Engineering. Here the Railways, Federal, Provincial and Local Authorities work together to make crossings safer. One factor which comes into the picture here is cost: \$3,000 yearly is required to maintain a crossing with standard flashing lights! If this seems expensive, the cost for building a rail/highway separation in which the train travels either above or below highway traffic is almost prohibitive: the price of each of these structures runs into several million dollars.

The third phase is Enforcement. Law enforcement agencies can help to reduce the rail/highway crossing incidents by coming down hard on motorists who violate law regarding rail/highway crossings.

Last, but not least, one must consider some common collision causes as well as the correct driver action. A few examples follow:



1. The driver sees the train approaching the crossing, but misjudges its speed and distance from the crossing.

Because of its size, misjudging a train's speed and distance is easy. Therefore, drivers should stop and wait for the train to pass.

2. A driver races the train to the rail/highway crossing, and is either struck by the train or runs into its side.

A driver must never race a train to the crossing. Drivers who do this are simply gambling with death.

3. When the train clears a rail/highway crossing, the driver immediately proceeds across the tracks without looking for other trains. A train, travelling on an adjacent track, either strikes or is struck by the vehicle.

Drivers must be patient and wait for a train to proceed a sufficient distance beyond the crossing so good visibility in both directions is ensured. A driver should never move while the flashing lights are operating. They stop flashing when it is safe to cross the tracks. However, even after the lights have stopped flashing, it is a good idea to double check in both directions before crossing the tracks.

4. A driver does not exercise caution when approaching a familiar rail/highway crossing because a train is not expected at this crossing at this time.

Familiarity breeds complacency. When approaching a crossing, a driver should always look for trains. Remember "Anytime is Train Time"!

5. When visibility at the rail/highway crossing is limited because of weather conditions or sight obstructions, the driver does not exercise proper caution and proceeds into the path of a train.

Drivers should reduce their speed and be especially observant if weather conditions or sight observations limit visibility of the rail/highway crossing and/or approaching trains.

These are just a few examples. More information on common collision causes/correct driver action, as well as rail/highway crossing safety in general, can be found in the OPERATION LIFESAVER program guide.

To summarize, too many people are killed and injured each year at rail/highway crossings. The problem is real, it is not the product of somebody's imagination. In order to solve this problem (and thereby protect people's lives), it is important that everyone work together to reach the ultimate goal: to reduce railway/highway crossing incidents, their related deaths and other relevant changes.

Drive Safe and Smooth and Save

Safe, smooth driving could save your company 15 to 20% of the annual fuel costs of a school bus. Let's review the safe driving rules that save dollars.

1. Attitude. The right attitude is essential for safe, economical driving. A responsible professional driver is concerned about the safety of his vehicle, his passengers and the financial well being of the bus owner/school district.
2. Safe, Smooth Driving means courteous, fuel efficient driving. You use energy to accelerate and gain momentum; you waste energy when you brake to slow down or stop. Looking ahead 12 seconds down the road at the traffic situation and maintaining a 4 second following distance between vehicles gives you space to slow down, accelerate or change lanes safely and smoothly. The objective is to try to minimize speed changes by being in harmony with the traffic tempo and, in urban areas, in phase with the traffic lights.
3. Reduce speed. As speed increases so does the potential for collisions, and greater speed also results in heavier fuel consumption.
4. Tire pressure. Keep tires inflated to their recommended pressure. This will result in safer and longer tire life. You save on tire replacement cost and fuel bills.

5. Weather/Road Conditions. It takes energy to splash water, push snow or plow through gravel and mud. For safety, economy and passenger comfort, whenever possible drive the cleared, paved routes even if it's a little further. In snow, follow the tracks, and on wet roads, stay in the dry tire prints left by other vehicles. Respond to the wind forces by driving more slowly into the wind, and letting it help you along when driving with the wind.

### Other Energy Saving Driving Tips

1. Shifting Gears. Get into high gear quickly. An automatic will shift earlier if you reduce pressure on the gas pedal as you gain speed. With manual transmissions, shift at an engine speed just high enough to permit progressive upward shifting (near the rpm for peak torque). Don't rev the engine to peak rpm between each shift.
2. Driving Hills. Going uphill, look ahead and gradually accelerate before the point where the vehicle would normally start to slow down. Don't floor the accelerator to maintain speed, let the speed fall off. Going down hill, ease up on the accelerator and save fuel by letting gravity maintain or increase the vehicle momentum.

3. Avoid idling. Idling gets you nowhere. Ten seconds of idling uses more fuel than restarting your engine. Except in traffic, turn the engine off when stopped. The best way to warm up a vehicle is to drive away smoothly as soon as you can.
  
4. Auxiliary Equipment. Turn off energy consuming equipment when not required, i.e., auxiliary rear heaters, electric defrost, fan motors, etc.
  
5. Pumping Gas Pedal and Revving Engine. Rapid depression of the gas pedal ("Pumping Gas Pedal") pumps a jet of gas into the carburetor. This pumping action may be required for cold weather starts or after a vehicle has been standing idle for days. Unnecessary pumping of the gas pedal/revving the engine wastes fuel and could cause engine damage.

Additional publications on vehicle fuel savings topics are available from:

Alberta Energy & Natural Resources  
Energy Conservation Branch  
2nd Floor, Highfield Place  
10010 - 106th Street  
Edmonton, Alberta  
T5J 3L8  
Telephone: (403) 427-5200

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